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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/512,131	10/21/2004	Hiroiyuki Okuyama	112857-534	2297
29175 7590 12/27/2006 BELL, BOYD & LLOYD, LLC P. O. BOX 1135 CHICAGO, IL 60690-1135			EXAMINER DIAZ, JOSE R	
			ART UNIT 2815	PAPER NUMBER
SHORTENED STATUTORY PERIOD OF RESPONSE		MAIL DATE	DELIVERY MODE	
3 MONTHS		12/27/2006	PAPER	

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/512,131	OKUYAMA ET AL.	
	Examiner	Art Unit	
	José R. Díaz	2815	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 October 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 46-90 is/are pending in the application.
- 4a) Of the above claim(s) 46-55, 73, 79, 81, 83, 85, 87 and 89 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 56-71, 74-78, 80, 82, 84, 86, 88 and 90 is/are rejected.
- 7) ☒ Claim(s) 72 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>10/21/03, 2/22/05</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of group II in the reply filed on October 12, 2006 is acknowledged.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 56-58, 60-67, 70-71, 74, 80, 82, 84, 86, 88 and 90 are rejected under 35 U.S.C. 102(b) as being anticipated by Okuyama et al. (US 2002/0117677 A1).

Regarding claims 56, 74, 80, 82, 84, 86, 88 and 90, Okuyama et al. teaches a method of manufacturing a semiconductor light emitting element having a semiconductor layer (132) of a first conduction type (n-type) which is formed on a major surface and includes a convex crystal portion (135) having an inclined crystal plane composed of a plurality of crystal planes inclined from the major surface by different angles of inclination to exhibit a convex plane as a whole [see fig. 55];

at least an active layer (136) and a semiconductor layer (137) of a second conduction type (p-type) which are sequentially layered at least on the inclined crystal plane of the crystal portion [see fig. 55];

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a first electrode (138) electrically connected to the semiconductor layer (132) of the first conduction type (n-type) [see fig. 55]; and

a second electrode (139) formed on the semiconductor layer (137) of the second conduction type (p-type) on the crystal portion and electrically connected to the semiconductor layer of the second conduction type [see fig. 55],

the method comprising:

growing a first semiconductor layer (132) of the first conduction type on a substrate (131) [see fig. 55];

forming a growth mask (133) having an opening at a predetermined position on the first semiconductor layer [see fig. 55];

selectively growing a second semiconductor layer (135) of the first conduction type on the first semiconductor layer exposed through the opening in the growth mask [see fig. 55]; and

sequentially growing at least the active layer (136) and the semiconductor layer (137) of the second conduction type to cover the second semiconductor layer [see fig. 55].

Regarding claims 57-58, Okuyama et al. teaches that the growth mask (133) includes a lamination of at least one of silicon nitride, silicon oxide nitride and silicon oxide [paragraphs 0247 and 0345].

Regarding claim 60, Okuyama et al. teaches that the crystal portion has a wurtzite or hexagonal crystal structure [see paragraph 0346].

Regarding claim 61, Okuyama et al. teaches that the crystal portion includes a nitride III-V compound semiconductor (i.e. GaN or AlGaIn layer) [see paragraph 00346].

Regarding claim 62, Okuyama et al. teaches that the semiconductor layer of the first conduction type, the first semiconductor layer, the second semiconductor layer, the active layer and the semiconductor layer of the second conduction type include nitride III-V compound semiconductor [see paragraphs 0345, 0346 and 0347].

Regarding claim 63, Okuyama et al. teaches that the crystal planes composing the inclined crystal plane are S-oriented planes [see paragraphs 0349 and 0351].

Regarding claim 64, Okuyama et al. teaches that the angle of inclination of the crystal planes (135) is stepwise smaller from a bottom of the crystal portion toward an apex thereof [consider the angle of inclination of the first crystal plane (which is vertically oriented or about 90°) and the angle of inclination of the second crystal plane (which is obtusely inclined or exceeding 90°. See fig. 55].

Regarding claims 65-66, Okuyama et al. teaches the crystal portion (135) has a six-sided steeple configuration [consider the hexagonal shape in paragraph 0346, which also shown in the embodiment disclosed in figure 72].

Regarding claim 67, Okuyama et al. teaches that the crystal portion is elongate in a direction parallel to the major surface [see fig. 72].

Regarding claim 70, Okuyama et al. teaches that the growth temperature for the active layer and the semiconductor layer of the second conduction type is set lower than the growth temperature for selective growth of the second semiconductor layer [See

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paragraph 0292: "The growing temperature lowered, the...active layer[] is grown. Then, the...cladding layer [] is grown..."].

Regarding claim 71, Okuyama et al. teaches that after the second semiconductor layer is selectively grown to have a crystal plane substantially parallel to the major surface on the top thereof [see paragraph 0251], an undoped semiconductor layer (consider the active layer) is grown on the top of the second semiconductor layer [see fig. 55].

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 59, 68-69, 75-76 and 78 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okuyama et al. (US 2002/0117677 A1).

Regarding claim 59, 68-69, 75-76 and 78, Okuyama et al. teaches an opening having a diameter of about 10 μm [see paragraph 0248]. However, Okuyama et al. fails to teach the claimed opening size range, temperature range, growth rate and distance between nearest two of the openings. However, these claims are *prima facie* obvious without showing that the claimed ranges achieve unexpected results relative to the prior art range. *In re Woodruff*, 16 USPQ2d 1935, 1937 (Fed. Cir. 1990). See also *In re Huang*, 40 USPQ2d 1685, 1688 (Fed. Cir. 1996) (claimed ranges of a result effective

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variable, which do not overlap the prior art ranges, are unpatentable unless they produce a new and unexpected result which is different in kind and not merely in degree from the results of the prior art). See also *In re Boesch*, 205 USPQ 215 (CCPA) (discovery of optimum value of result effective variable in known process is ordinarily within skill of art) and *In re Aller*, 105 USPQ 233 (CCPA 1955) (selection of optimum ranges within prior art general conditions is obvious).

Allowable Subject Matter

6. Claim 72 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

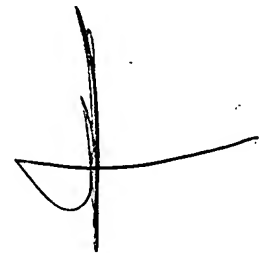
Correspondence

Any inquiry concerning this communication or earlier communications from the examiner should be directed to José R. Díaz whose telephone number is (571) 272-1727. The examiner can normally be reached on Monday through Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kenneth Parker can be reached on (571) 272-2298. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

A handwritten signature in black ink, appearing to read 'K. Parker', is written over the printed name and title.

KENNETH PARKER
SUPERVISORY PATENT EXAMINER

José R. Díaz
Examiner
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